

Alba 131

1871

A.M./F.M. compact portable radio receiver

Introduction

Alba model 131 is a compact a.m./f.m. portable radio receiver with a semi-conductor complement of ten transistors and four diodes. It is a two waveband receiver, the wavebands covered are 187-566m (m.w./a.m.), and 87-108Mc/s (v.h.f./f.m.), selection is by means of a slide-switch. Two aerials are incorporated, an internal ferrite rod assembly for m.w. and a telescopic aerial for v.h.f.

The circuit features a three stage i.f. amplifier for v.h.f./f.m., and a separate oscillator when switched to m.w. Additive mixing taking place in the base circuit of the first i.f. amplifier transistor stage.

A maximum power output of 480mW is handled by a 4in dia. permanent magnet loudspeaker of 4Ω impedance which is muted when an earphone jack plug is inserted in the socket provided. The output stage is compensated against variations in ambient temperature by the inclusion of a negative temperature co-efficient resistor in the push-pull class B output stage bias network.

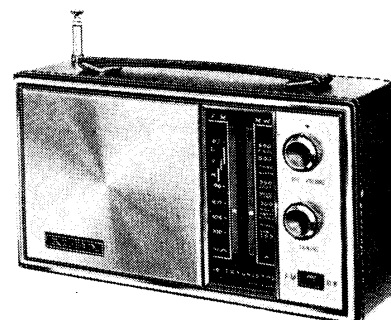
Power for the receiver is supplied by four Vidor type LPV11 cells or their equivalent.

Transistor analysis

Transistor voltages quoted in cols. 5 and 6 were derived from technical information supplied by the manufacturers. They are all positive with respect to the battery negative and apply to quiescent conditions. The meter used was a model 8 Avometer.

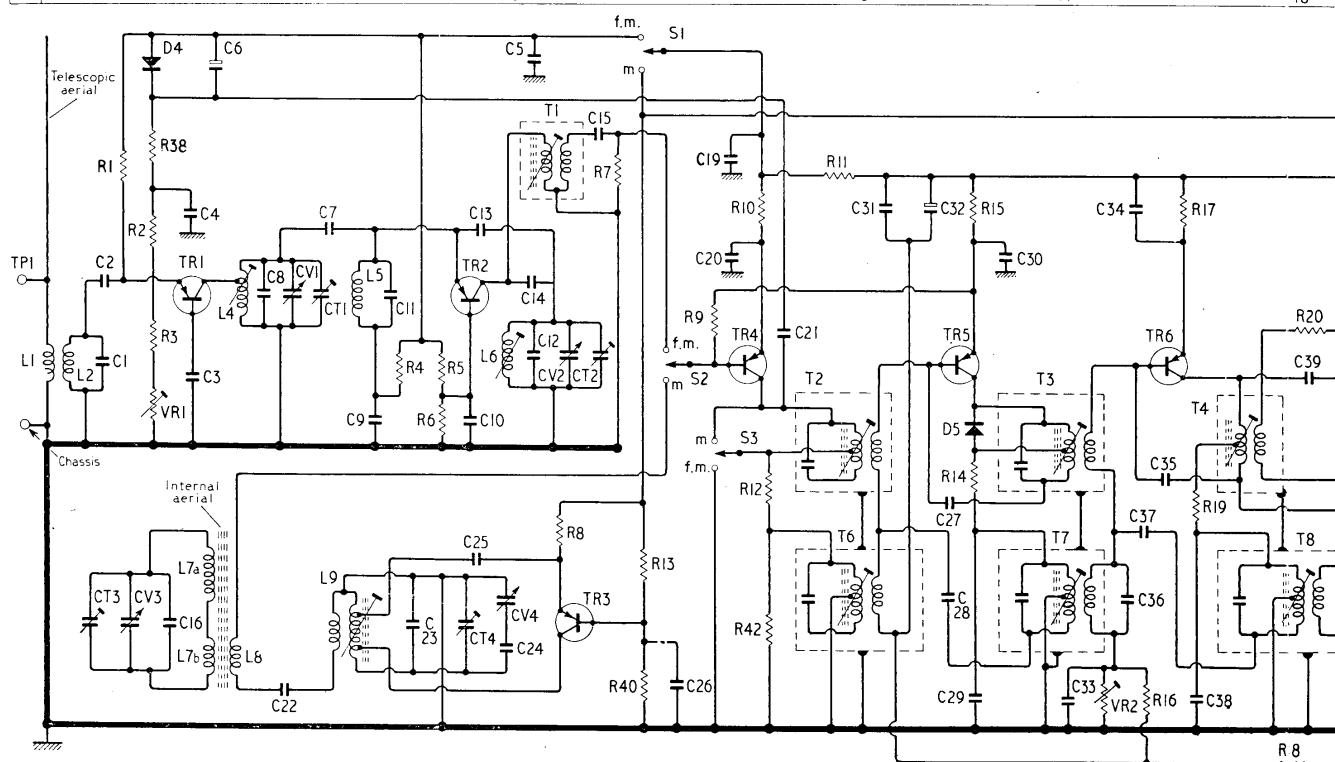
Circuit alignment

Equipment required. — An r.f. signal generator covering the range 300kc/s-2Mc/s amplitude modulated 30 per cent at 400c/s; an f.m. sweep generator with the following ranges: 10-7Mc/s deviated 300kc/s at 50c/s, 87Mc/s and 108Mc/s deviated 25kc/s at 1kc/s on each range; an r.f. coupling coil; an output meter to match 4Ω terminated with a miniature jack plug; an oscilloscope (c.r.o.); a shunt diode rectifier network made up with a 2,000pF capacitor, an OA79 diode and a 33kΩ resistor (see illustration overleaf), and one each 0.01μF and 0.1μF capacitors.



Appearance of the Alba 131 radio receiver.

C	1,2	4,3	6	8,CV1,CT1,7	11	13,10	5,14,12	CV2,CT2,15	19,20	21	31	32	30	34	39						
	CT3	CV3	16	22	23,CT4	25	24,CV4	26				27,28,29		33	36,37,35	38					
R		VR1	38,2		4	5,6	8	13,40	9	10	11		15		VR2	16	17	19		18	20
L	1,2			4	5		T1				T2	T6		T3				T4		T8	
			7	8	9	6								T7							



During a.m. alignment attenuate input signal so that receiver output does not exceed 50mW thereby preventing a.g.c. action masking the alignment peaks.

Switch on test equipment and allow 15 minutes (approximately) to warm up. Pre-set volume control to maximum and connect audio output meter via earphone jack. Loosely couple r.f. coupling coil to ferrite rod aerial, all a.m. i.f. and r.f. signals are fed via this source.

1. — Switch receiver to m.w. and tune to 550m. Feed in a 470kc/s a.m. signal and adjust **T8**, **T7** and **T6** for maximum output. Repeat until no further improvement can be obtained.

2. — With receiver still tuned to 550m, feed in a 545kc/s a.m. signal and adjust **L9** and **L7a** (by sliding coil former along ferrite rod) for maximum output.

3. — Tune receiver to 199m and feed in a 1,507kc/s a.m. signal. Adjust **CT4** and **CT3** for maximum output.

4. — Repeat operations 2 and 3 until no further improvement can be obtained. Disconnect a.m. signal generator.

5. — Switch receiver to v.h.f./f.m. and tune to a signal free position in the waveband. Connect the f.m. sweep generator via a 0.01 μ F capacitor to **TP1** and chassis and the c.r.o. via the diode network to TP2 and chassis. Detune **T5**.

6. — Feed in a 10.7Mc/s signal deviated 300kc/s at 50c/s. Adjust **T4**, **T3**, **T2** and **T1** for maximum amplitude, symmetrical about 10.7Mc/s (see Fig. 1). Attenuate input signal so that response amplitude is just large enough to produce a recognizable pattern.

7. — Disconnect and remove the diode network,

(Continued overleaf col. 1)

Transistor table

Transistor	A.M. Emitter (V)	Base (V)	Collector (V)	F.M. Emitter (V)	Base (V)	Collector (V)
TR1 2SA440 ..	—	—	—	4.8	4.3	—
TR2 2SA440 ..	—	—	—	3.8	3.5	—
TR3 2SA203AA ..	4.5	4.3	—	—	—	—
TR4 2SA324 ..	5.3	5.0	—	4.3	3.9	—
TR5 2SA321 ..	5.3	5.0	0.05	5.0	4.7	0.05
TR6 2SA321 ..	4.7	4.2	0.1	4.5	4.0	0.1
TR7 2SB185AA ..	5.1	4.8	1.7	4.9	4.6	1.6
TR8 2SB186 ..	4.4	4.1	0.3	4.2	3.9	0.3
TR9 2SB22 ..	6.0	5.8	0.02	6.0	5.8	0.02
TR10 2SB22 ..	6.0	5.8	0.02	6.0	5.8	0.02

Quiescent current: 20mA. Current drain at maximum output: 140mA.

Component values and locations

Resistors			Capacitors		
R1	220 Ω	A1	C1	90pF	A2
R2	1.8k Ω	A2	C2	0.01 μ F	A1
R3	33k Ω	A1	C3	0.01 μ F	A2
R4	2.2k Ω	A2	C4	0.01 μ F	A2
R5	2.2k Ω	A2	C5	0.01 μ F	A2
R6	5.1 Ω	A2	C6	5 μ F	A1
R7	39k Ω	A2	C7	2pF	A2
R8	1.2k Ω	B2	C8	8pF	A1
R9	10k Ω	A2	C9	500pF	A2
R10	1k Ω	A2	C10	1,000pF	A2
R11	100 Ω	B2	C11	25pF	A2
R12	100 Ω	A2	C12	8pF	A2
R13	3.3k Ω	B2	C13	3pF	A1
R14	150 Ω	B2	C14	15pF	A2
R15	680 Ω	A2	C15	5,000pF	A2
R16	10k Ω	B2	C16	2pF	B1
R17	1k Ω	B2	C17	0.01 μ F	A2
R18	5.6k Ω	B2	C18	5,000pF	A2
R19	150k Ω	B2	C19	5pF	A2
R20	270 Ω	B2	C20	5,000pF	A2
R21	330 Ω	B2	C21	5pF	A2
R22	1k Ω	B2	C22	5pF	A2
R23	12k Ω	B2	C23	5pF	A2
R24	1k Ω	B2	C24	200pF	A2
R25	1k Ω	B2			
R26	100k Ω	A1			
R27	12k Ω	A1			
R28	820 Ω	A1			
R29	3.9k Ω	B1			
R30	5.6k Ω	B1			
R31	560 Ω	B1			
R32	39k Ω	B1			
R33	1.5k Ω	B1			
R34	100 Ω	B1			
R35	100 Ω	B1			
R36	2.7 Ω	B1			
R37	33k Ω	B1			
R38	5.6k Ω	A2			
R39	1k Ω	A1			
R40	15k Ω	B1			
R42	120k Ω	A2			
VR1	100k Ω	A1			
VR2	100k Ω	B2			
VR3	5k Ω	A1			

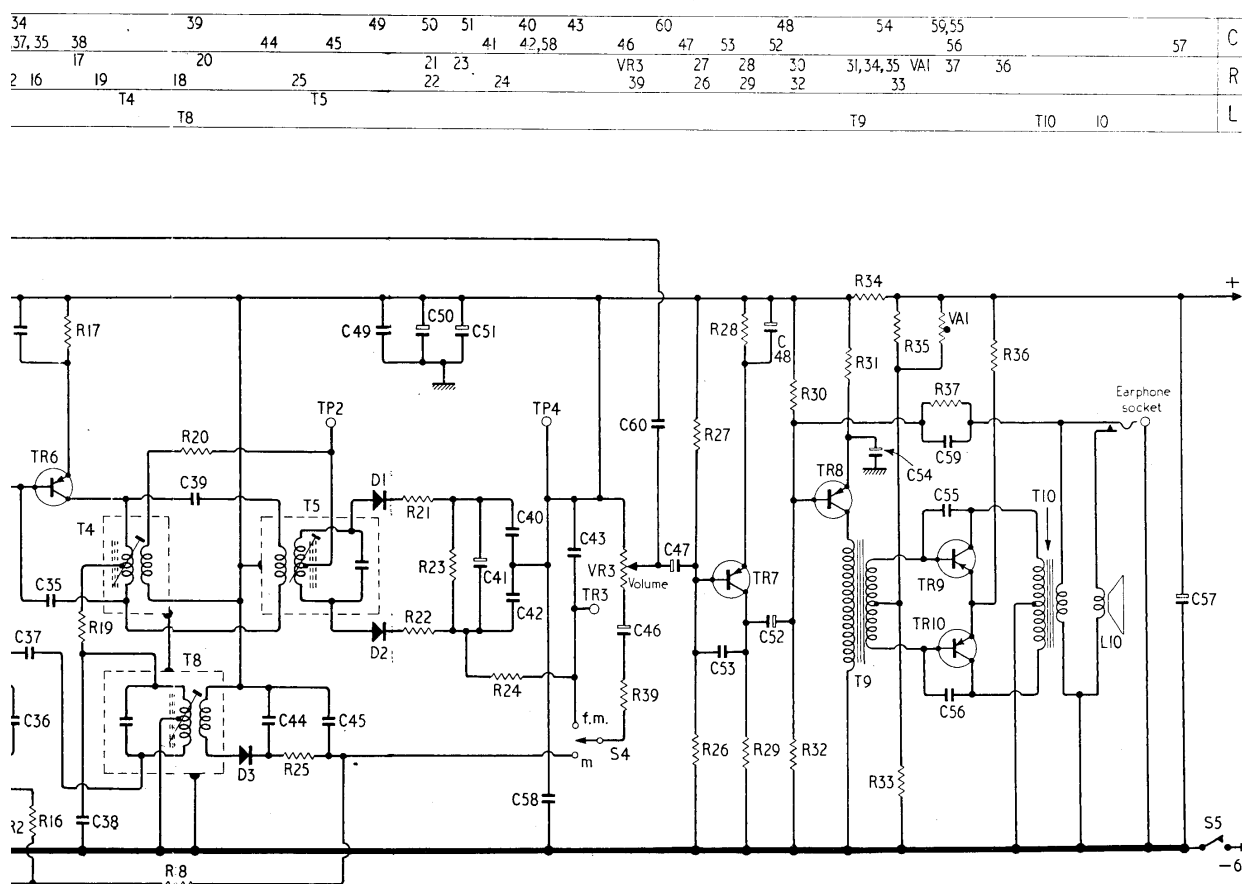
C25	5,000pF	B2
C26	0.01 μ F	B1
C27	10pF	A2
C28	3pF	B2
C29	200pF	B2
C30	0.04 μ F	A2
C31	0.02 μ F	B2
C32	10 μ F	B2
C33	0.02 μ F	B2
C34	0.02 μ F	B2
C35	8pF	B2
C36	2,000pF	B2
C37	3pF	B2
C38	200pF	B2
C39	30pF	B2
C40	1,000pF	B2
C41	5 μ F	B2
C42	1,000pF	B2
C43	7,500pF	B2
C44	0.01 μ F	B2
C45	0.01 μ F	B2
C46	5 μ F	A1
C47	5 μ F	A1
C48	30 μ F	A1
C49	0.04 μ F	B2
C50	200 μ F	B2
C51	200 μ F	B1
C52	1 μ F	B1
C53	1,000pF	A1
C54	100 μ F	B1
C55	5,000pF	B1
C56	5,000pF	B1
C57	200 μ F	B1
C58	0.01 μ F	B2
C59	1,000pF	B1
C60	0.04 μ F	A1
CT1	—	A1
CT2	—	A1
CT3	—	A1
CT4	—	A1
CV1	—	A1
CV2	—	A1
CV3	—	A1
CV4	—	A1

Coils and transformers

L1	—	B1
L2	—	A1
L4	—	A2
L5	—	A2
L6	—	A1
L7a,b	—	B1
L8	—	A2
L9	—	A2
L10	4 Ω	**
T1	—	A2
T2	—	A2
T3	—	B2
T4	—	B3
T5	—	B3
T6	—	B2
T7	—	B3
T8	—	B3
T9	—	B1
T10	—	B2

Miscellaneous

D1-D3	1S188	B2
	or IN-60	
D4	1S188	A2
	or IN-60	
D5	1S188	B2
	or IN-60	
VA1	SDT-09	B1
S1-S4	—	A2
S5	—	†
†	On/off control	
**	Loudspeaker	



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Continued from overleaf—

then connect c.r.o. via a 0.1 μ F capacitor to **TP3** and chassis.

8. — Feed in a 10.7Mc/s signal deviated 300kc/s at 50c/s. Adjust **T4** for a symmetrical 'S' curve, and **T5** to centre 10.7Mc/s marker in the straight section of the curve (see Fig. 2).

9. — Repeat operations 6-8 for optimum response. Disconnect c.r.o.

10. — Tune receiver to 87Mc/s, pre-set volume control to maximum and feed in an 87Mc/s signal deviated 25kc/s at 1kc/s. Adjust **L6** and **L4** for maximum output as observed on the audio output meter.

11. — Tune receiver to 108Mc/s and feed in a 108Mc/s signal, deviated 25kc/s at 1kc/s. Adjust **CT2** and **CT1** for maximum output as observed on audio output meter.

12. — Repeat operations 10 and 11 until no further improvement can be obtained. Disconnect and remove test equipment.

Sensitivity

M.w./a.m. sensitivity for 50mW output. — 1Mc/s via a 0.1 μ F capacitor to **TR4** base: 27 μ V. 470kc/s via a 0.1 μ F capacitor to the following stages: **TR4** base 16 μ V, **TR5** base 85 μ V, **TR6** base 1.5mV, **D3** anode 40mV.

V.h.f./f.m. sensitivity for 0.5V across **C41**. — 90Mc/s c.w. via 0.1 μ F capacitor to **TP1**: 30 μ V. 10.7Mc/s c.w. via 5pF to the following stages:

Fig1.

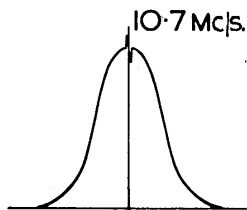
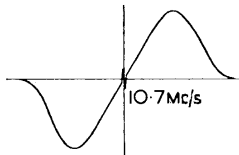
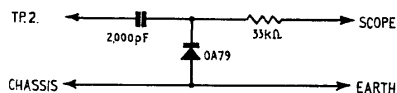


Fig2.



Above: Response curves.



Above: The shunt diode network as described under 'Circuit alignment'.

Manufacturer's service department

Alba (Radio and television) Limited,
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London, E.C.2.

(Telephone: CLerkenwell 1322)

TR2 emitter 4.5mV., **TR4** base 11mV., **TR5** base 35mV., **TR6** base 550mV. For a 50mW output, a 90Mc/s signal deviated 25kc/s at 1kc/s fed via a 0.1 μ F capacitor to **TP1**: 7 μ V.

Dismantling

Remove control knobs (pull off), then unscrew and remove the screw securing the fibre cover. With reference to the sketch illustrating component locations on printed panel, unscrew and remove; three screws 'A'; one PK screw 'B', and the slotted pillar 'C'. The chassis may now be lifted out of the case.

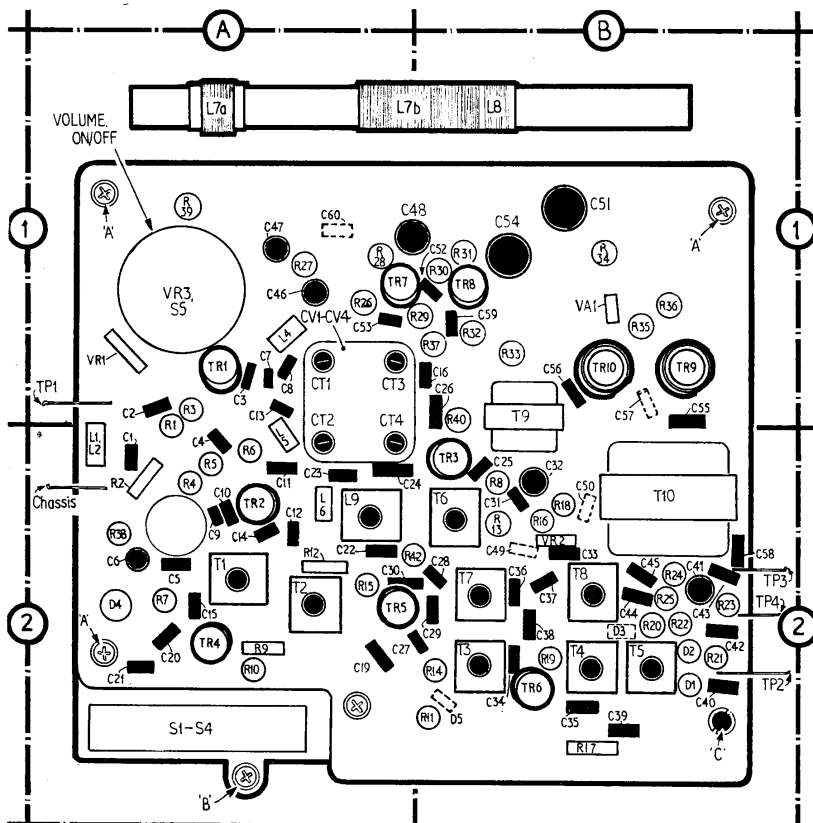
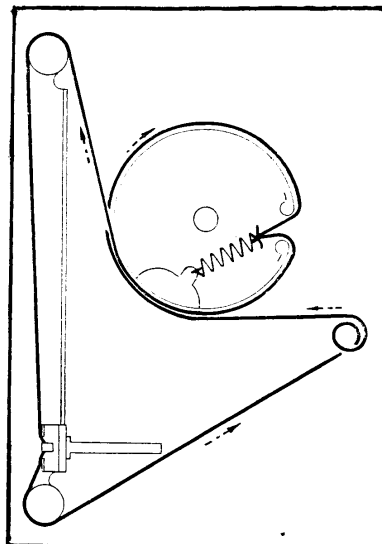
When replacing make sure mask is fitted to wavechange knob and fibre washer is fitted between wavechange switch bracket and front moulding at fixing 'B'.

General notes

Drive cord replacement. — To replace drive cord remove chassis as described under "Dismantling". Prepare a suitable length of drive cord and with the tuning drum rotated fully clockwise route the cord as illustrated in sketch (below), making 2½ turns anti-clockwise (winding from the rear), on the control spindle.

Adjustments. — Switch receiver to v.h.f./f.m. and adjust **VR1** for 600 μ A measured in the emitter circuit of **TR1**. Adjust **VR2** for 400 μ A measured in the collector circuit of **TR5**. Note: Both these current measurements were made under quiescent conditions.

Additional notes



Component-side view of the printed panel. Above right: Illustration of the drive cord assembly with the tuning drum rotated fully clockwise, as described under 'General notes' above.